

AIR POLLUTION—THE THREAT IS
NOW

Mr. YARBOROUGH. Mr. President, in an article published recently in the Washington Post, writer Joshua Lederberg pointed out how air pollution could cause genetic mutations.

We already know about the severely adverse affects air pollution can have upon the health of human beings, even to the extent of causing death. Indeed, in 1930 in Belgium, 60 people died from air pollution; in 1948 in Pennsylvania, 2,037 died from air pollution. In 1952, London, 4,000; in 1961, Los Angeles, 75,000.

In Los Angeles alone the schoolchildren are not allowed to exercise, to run, to jump, to skip indoors or outdoors on smog alert days. That is just the beginning of what we are in for.

We pour out 130 million tons of material into the atmosphere each year. That is roughly equivalent to the total tonnage of all steel production in the United States.

Mr. President, it is the epitome of human tragedy that we overfund new military items such as the C5-A and underfund programs so vital to the survival and progeny of man.

Because the problem of pollution is worldwide in scope and severity, I have offered Senate Joint Resolution 156, a bill to establish an interagency commission with the specific duty of planning this Nation's participation in the 1972 U.N. Conference on the Human Environment. This bill, adequate funding of all pollution control bills, and all efforts to deal with this monumental crisis should be given one of the highest priorities of this Nation and all nations everywhere.

Mr. President, I ask unanimous consent that the article, entitled "Air Pollution Ingredients Are Suspect for Mutation," by Joshua Lederberg, published in the Washington Post of October 18, 1969, be printed in the Record.

There being no objection, the article was ordered to be printed in the Record, as follows:

AIR POLLUTION INGREDIENTS ARE SUSPECT
FOR MUTATION

(By Joshua Lederberg)

Many of the effects of radiation on living cells can be mimicked in laboratory tests with derivatives of hydrogen peroxide and other chemically active forms of oxygen. During the last 25 years we have learned to take a critical view about radiation and have set increasingly suspicious standards for regulating our exposure to it. Were we quite logically consistent, we would be just as critical about peroxides.

Just the reverse has happened, however, and active forms of oxygen are an increasingly important part of our environment. Much of this rise in exposure is an unintended by-product of urban life. For example, much of the eye-irritating part of Los Angeles-type smog comes from ozone and PAN (peroxacyl nitrate), typical peroxide-like compounds.

Peroxides are, however, also used very widely in industry. They were, for example, introduced for bleaching flour in the 1950s to take the place of nitrogen trichloride when this compound was found to generate a nerve poison that caused convulsions in dogs (not, in low doses, in other species). The peroxides received government approval as a good additive on the strength of a limited number of tests on rats and dogs. The required tests do not begin to reach the possibilities of genetic or fetal effects.

On the other hand, a much more searching inquiry has been demanded of radiation sterilization of foods, and after many years, approval is still withheld from this process. There is good theoretical reason to believe that the treatment of foodstuffs by radiation and peroxides will yield very similar kinds of chemical products, and it is preposterous that one and not the other should be subject to such critical scrutiny.

In testimony before Sen. Edmund S. Muskie's subcommittee on air pollution last year, Dr. S. S. Epstein of the Children's Cancer Research Foundation summarized what was known of the mutational effects of air pollution—namely, almost nothing: "With the exception of ozone, which has been found to cause chromosome breaks, there are no published data . . . all the more surprising as certain fractions of air pollutant extracts are known to contain poorly defined compounds which are generally both carcinogenic and mutagenic."

It is painfully obvious that the air of many cities could not meet the quality standards, feeble as they are, for food additives. As far as I know, PAN has not been directly tested for mutational potency. My personal experience with organic peroxides, goes back, however, more than 20 years, and they are indeed powerful mutagens according to a wide variety of tests. On elementary chemical principles, it would be incredible to expect PAN and ozone to behave otherwise.

Ozone is a natural constituent of the atmosphere at high altitudes and supersonic passengers are likely to experience modest amounts of it unless special methods are used to exclude it from the cabin of the SST. It is also being advocated for the treatment of sewage, water supplies and even conditioned air with no thought of the kind of biological testing it ought to have.

Carefully used, ozone may be an advantageous oxidant for cleaning up dirty water, but before it is allowed to pervade the environment we must learn its potential hazards—and especially the kinds of less active, intermediate products it may form with a variety of substances in the environment and in the body.

Our main defense against peroxides is the enzyme catalase, which occurs in most tis-

sues and causes the rapid breakdown of hydrogen peroxide. (This causes the familiar foaming when "peroxide" is applied to a wound.) In normal people, it is supposed (we hope) to minimize the chance of genetic damage.

However, a few rare individuals are lacking in catalase from a genetic defect, and the enzyme may also be altered in certain diseases and under the influence of some drugs. Also, given the variety of reactive compounds formed by peroxides, not all of them equally quickly neutralized by catalase, we cannot afford to be complacent about these compounds as potential causes of mutations and cancer.